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ABSTRACT

The development of computer-mediated asynchronous platforms for the delivery of online coursework brings college professors new questions about the features these platforms offer and the degree to which each feature is significant to the achievement of students. Are all features designed in the same way across platforms? Are there some features that are more reliable, easier to operate and more attractive to students who use them? Which of the features can be connected with objective measures of achievement? Is the type of use given to the feature by an instructor a significant element of the feature? This paper relates a pilot study of three courses offered online using three different platforms and in three different campuses in order to explore the range of features in use and their link to student satisfaction and achievement. It also contrasts student outcomes with three onsite courses offered by the same professors. The long-term purpose of this study is to learn about hypothetically significant features that can then be improved. (Author)

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Significant Features Of Asynchronous Learning: Summary of a Pilot Study[1]

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Abstract

The development of computer-mediated asynchronous platforms for the delivery of online coursework brings college professors new questions about the features these platforms offer and the degree to which each feature is significant to the achievement of students. Are all features designed in the same way across platforms? Are there some features which are more reliable, easier to operate and more attractive to students who use them? Which of the features can be connected with objective measures of achievement? Is the type of use given to the feature by an instructor a significant element of the feature? This paper relates a pilot study of three courses offered online using three different platforms and in three different campuses in order to explore the range of features in use and their link to student satisfaction and achievement. It also contrasts student outcomes with three onsite courses offered by the same professors. The long-term purpose of this study is to learn about hypothetically significant features that can then be improved.

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Review of the Literature

For the sake of brevity in these Conference Preceedings there will not be a review of the literature in asynchronous learning or the meassurement of significance as an element of a learning model. In order to obtain features we tapped a "benchmarking" study conducted by a private research organization, the Institute for Higher Education Policy (IHEP), located in Washington, D.C. The sponsors of the study, Blackboard Inc. the producer of one web platform and the National Education Associationa political organization of teachers, to which I belong, clearly had some interest in the outcome. The method IHEP used, however, closely resembles the standard methodology for securing "benchmarks" in the private sector and in educational quality systems in which State standards are often based. The participants in the study, which were also visited and polled on the crucial elements of the process; were quite diverse institutions of higher education and some were representative of our type of institution. Thus, armed with little but useful knowledge, we began to study. In fuller-length papers the literature on measuring significance and on asynchronous models can be discussed

The Pilot Study

The courses and grading policy

Three professors, who teach graduate courses online and also have the option to teach these courses onsite, offer the same course in the two versions in the same term. The courses are offered to graduate students of educational administration.

Each student is graded in three areas:

1) Student Participation refers to how often a student speaks in class (on the onsite courses) or posts messages on the Bulletin Board or the listserv (on the online courses). There's also a determination made by the graduate assistant on whether or not the comment or question is on-target. There are 15 weeks on each course but the maximum grade is 40, so there is a top limit or "ceiling" to classroom participation.
2) Group Project refers to a cooperative activity in which teams selected by the professor collaborate to obtain a maximum grade of 30. The grade is given for the entire team.
3) A Final Exam is administered containing 15 questions, which can receive a maximum grade of 30.

Measures

The courses are then compared with each other on the following factors:

1) The grades received by students
2) The participation grade
3) The group project grade
4) The final exam.

There are two surveys given to each student, one during the first week and another during the 13th week. In addition, university-prepared course evaluations were given to both groups as mandated by university policy. These results are compared.

Analysis of Data

1) The drop-ad activity for onsite courses was higher than for online Students enroll in the courses as required by their degree plan, without knowing that one of the courses would be held online. At the first meeting, the professor announces the study to those selected to be in the online course. Students could drop the course if they did not wish to take it online and they were then assigned to the onsite course. Of the 43 students who were given this option by the three professors, 3 decided to change the course at that point leaving 40 students and there were no subsequent drops. In the onsite courses, 45 were originally enrolled, adding the three who opted out of the online course, raised this total to 48, however 6 dropped or withdrew during the course leaving 42. The students on the onsite course were not told about the study or the availability of the online course. The drop-add activity for each course was higher for the onsite course. Table 1 shows student retention.

Table 1 Student Retention

Type of Course	First-day Enrollment	After 4 weeks	After 8 weeks	Completed
Online	43 (100%)	40 (93%)	40 (93%)	40 (93%)
OnSite	48 (100%)	45 (90%)	42 (87%)	42 (87%)

This is not typical, dropping online courses is much more prevalent than in onsite courses. This atypical behavior maybe due to the fact that these online students were aware of the research being conducted and were eager to cooperate with it.

2) Females did generally better in final grade across the three course pairs. See Table 2.

Table 2 Comparison of Females versus Males on Final Grade

Gender	C1online	C1oniste	C2online	C2onsite	C3online	C3onsite	Average
Females	80.2	78.7	74.7	86.1	78.3	86.1	80.7
Males	76.4	71.9	71.6	84.3	82.3	88.3	79.1
Average	78.9	72.9	72.5	85.7	80.5	87.1	79.9

3) This was not true however in the variable of Participation. In this variable males, both onsite and online received a better Participation grade than females. The reason for the higher overall grade by females seems to come from a higher grade in the Final Exam. Since Group Projects were carried out, in all but two teams, by mixed-gender teams, it was not possible to compare gender outcomes in this variable. Table 3 contains the data on the Participation comparison.

Table 3 Comparison of Females versus Males on Course Participation

Gender	C1online	C1oniste	C2online	C2onsite	C3online	C3onsite	Average
Females	25.1	15.2	14.3	33.1	21.4	30.9	23.3
Males	27.8	16.2	18.1	31.8	25.9	37.9	26.3
Average	26.6	17.1	16.8	32.5	23.0	34.6	24.8

4) On the Participation variable we found that online Course 1 had a higher student participation grade than the onsite version. In the other two pairs, the onsite classroom participation is considerably higher. The online participation was obtained by counting and evaluating the postings made by students to their discussion group boards and also including e-mails sent to the listserv. However, the onsite course rating was an interpretation made in-class by student assistants. Since we did not conduct inter-rater reliability research prior to conducting this preliminary study, and three different graduate students were used to rate onsite student participation, we cannot be certain that this difference is not related to different raters' perspectives.

5) A review of the online Bulletin Boards was conducted to determine what kind of behavior on the part of the professor contributed to increasing or decreasing participation on the part of students. Like classroom participation, a professor can have an inhibiting effect by either ridiculing, excessively challenging or refusing to accept as valid, comments made by students. It is also the case that a professor can inhibit discussion on a question when she/he provides a quick answer to a question rather than remaining silent or asking others to voice their opinions regarding the question. The same appears to be true in Bulletin Board discussion. In Course 3 online, which experienced the lowest number of postings on the part of students (393), the professor answered nearly all postings containing questions before any other student had a chance to comment. Only when the professor was "disconnected" from the Bulletin Board, either because of travel or other activity, did students take it upon themselves to provide responses or opinions regarding another student's postings. Conversely, in online Course 1 which experienced the highest number of postings (1,097), student postings were allowed to remain unanswered for at least 48 hours and after the hiatus when the professor intervened, he often responded to questions with other questions which elevated the number of postings per issue raised.

6) This observation led to the development of a formula to estimate student responses to professor's interventions which fits the data from each of the three online courses as follows:

a) If professor waits at least 48 hours, then 40-50% of the students post responses or comments on others' comments;
b) And if professor asks questions about a student's posting (whether a question or a statement) then 70-90% of the students provide responses;
c) If a professor provides responses to each question and/or comment without waiting 48 hours, then 0-20% additional student postings can be expected.

This formula suggests that the professor's use of the Bulletin Board for classroom discussion is similar to professor's onsite interventions on student discussions in its effect on student participation. Given the higher correlation of Participation to Final Grade in Course 1, this feature and its use appears to be significant to overall student achievement. (See Table 11)

7) We expected that online courses would not be as effective as onsite courses on the variable of Group Projects. We hypothesized that, since the onsite classes had facilitated familiarity among students who met with each other every week; this would pave the way for a more effective teaming in the Group Project. This was true in Course 1 where onsite students averaged 28.8 on their group projects while online students achieved an average of 26.7. But the other two courses reflected the opposite of the expectation. See Table 4.

Table 4 Comparison of student grades on Group Projects Online versus Onsite Courses

	C1online	**C1oniste**	**C2online**	**C2onsite**	**C3online**	**C3onsite**	**Average**
Average	26.5	28.8	28.5	26.9	28.8	25.6	27.5

8) All three professors coordinated the preparation of a final exam so that it contained the same questions and was graded by one person, increasing the reliability of the score. Course 1 gave the test onsite to both online and onsite students in one Saturday. Courses 2 and 3 online gave the test using an external server owned by a commercial provider. The onsite versions of Courses 2 and 3 gave their exams onsite the same day the online exam was available to minimize "bleeding" of information from one group to another about the contents of the test. We found that students scored very close to each other when compared within course pairs and across course pairs. See Table 5.

Table 5 Comparison of student grade on Final Exam Online versus Onsite Courses

	C1online	**C1oniste**	**C2online**	**C2onsite**	**C3online**	**C3onsite**	**Average**
Average	25.6	26.9	27.8	26.1	27.40	26.7	26.7

Correlations

We correlated the final grade with the three scored variables, Participation, Group Project and Final Exam. These correlations gave us additional insight on how students construct knowledge using different modalities of delivery.

9) Students Participation scores correlated the highest overall with the Final Grade. In online Course 1, students Participation score correlated 0.944 (<.001) with their Final Grade. On Course 2 online, students Participation score correlated 0.870 (<.002) with their Final Grade. On Course 3 online, students Participation score correlated 0.682 (<.005) with their Final Grade.

10) When Participation scores are compared across online courses, we find that in Course 1 students online contributed 1,097 postings, a much higher number than in Course 2 where students contributed 498 and on Course 3 where students contributed 393. This also coincides with the higher participation score of students in Course 1 online, but it is

not even higher as it is limited by the ceiling placed on the grade the students can receive for this activity

11) The correlation between Participation and the Final Exam in online Course 1 is strong (.654<.001) while the Correlation between Participation and Final Exam in Course 2 online is a negative one (-0.192<.005) and in Course 3 online is very weak (0.063<.001).

12) The correlation between Group Project score and Final Grade were weak or non-existent. We think that the Group Project, intended to practice students in the art of collaborating toward a final product and is not a content objective per-se, therefore contributed less toward the achievement of a higher grade on a content-based exam. Also, since a) groups were organized on the basis of the distance between students' home addresses and not homogenously by previous performance, and b) the group received one grade for all participants; these grouping and grading factors conspired to produce a lower correlation between this factor and the final grade students received. In order to further sustain these hypotheses we ran a correlation between Group Project grade and Final Exam and found weak or no correlations between the two. See Table 6.

Table 6 Correlations Between Students Final Grade and Study Variables

	Final Grade and Participation	**Final Grade and Group Project**	**Final Grade and Final Exam**	**Participation and Exam**	**Group Project and Exam**
C1online	0.944<.001	0.492 <.002	0.774<.005	0.654 <.001	-0.456<.005
C1onsite	0.880<.001	-0.018<.002	0.378<.001	0.012<.001	-0.012<.005
C2online	0.870<.002	0.225<.002	0.250<001	-0.192<.005	0.013<.002
C2onsite	0.897<.001	0.669<.002	0.258<.001	-0.014<.005	0.023<.002
C3online	0.682<.001	0.549<.001	0.447<.001	0.063<.001	0.167<.005
C3onsite	0.755<.001	0.353<.001	0.128<.005	-0.382<.002	0.239<.005

Student Satisfaction

13) The level of overall satisfaction, as measured by the student surveys, were fairly high with the online courses (68% of the comments being positive) but slightly lower than the level of satisfaction with the onsite course (71% of the comments being positive). The following Table 7 details the overall satisfaction scores.

Table 7 Comparison of Onsite and Online Courses on Overall Satisfaction

	Course 1	**Course 2**	**Course 3**	**Average**
Online	78%	72%	56%	68%
Onsite	82%	74%	57%	71%

14) The differences between the pre and post surveys are greater for the online course than for he onsite course on the variable of student apprehension. In the pre-course survey 42% of the students expressed High or Very High "stress" stemming from how

they would do in this course, compared to 18% of the students in the onsite course. However in the post-survey the online students apprehension with future course online fell to (15%) more in line with the level of apprehension in the onsite course.

15) The three university-prepared course evaluations cannot be fully compared because each are prepared with different criteria and item construction making them essentially non-equivalent measures. However some of the items are sufficiently similar to allow for some comparison. The following are some of the variables of interest to this study. See Table 8.

Table 8 Comparison of results of university-prepared course evaluation on comparable values across campuses

	Overall rating as Instructor	**Instructor outside availability**	**Courtesy to students**	**Clarity of Course Objectives**	**Encouragement of critical thinking**
C1 onsite	100%	100%	100%	100%	100%
C1 online	90%	90%	100%	80%	100%
C2 onsite	85%	90%	100%	100%	90%
C2 online	80%	70%	80%	70%	90%
C3 onsite	78%	80%	80%	80%	85%
C3 online	76%	70%	60%	70%	85%

Conclusions

At the beginning of this study we had four research questions which we will repeat here and summarize findings in response to these.

Are all features designed in the same way across platforms?

Because different people designed each platform and each is a descendant of platforms designed for differing purposes, the platforms' features are therefore measurably different in design. We lack sufficient data required to make a definitive statement on which design provides the most significant input to student achievement. One might be able to discern differences with large samples over time but not from this small sample. We have become familiar with three platforms, which are essentially effective in enabling the presentation of material. Some are easier to operate by professors unfamiliar with the technology, while others require at least rudimentary knowledge of HTML. Since most professors end up doing their own course design after an all too brief period of institutional support, each platform could use a simpler method for designing and incorporating course materials.

Are there some features which are more reliable, easier to operate and more attractive to students who use them?

Given the levels of actualization reported earlier it appears as if the features of all three platforms have a long way to go before they are able to give students a trouble-free operation. When compared with the use of listserv to engage in dialog, Bulletin Boards are considered superior by students overall. But when compared with the internal e-mail facility of all platforms tested, external listservs were judged by students to be more

effective. One course with a CD-ROM of lectures provided a higher level of satisfaction with professor's explanations than the other two. Still, the CD-ROM feature could not be linked with online material in any platform, so the student had to logout of the course and start the CD-ROM before he or she could use the material.

Which of the features can be connected with objective measures of achievement?
We were able to correlate the use of Bulletin Board with both Final Grade and performance in Final Exam. Students rated online Course 1 as Very Effective in conveying information through web pages and Courses 2 as Effective and 3 as Moderately Ineffective. The features are hypothetically linked to achievement but the use given to them by individual professors may be even more important than the construction of the feature itself. In summary, there are no other features than correlate to student achievement.

Is the type of use given to the feature by an instructor a significant element of the feature?
This seems to be the most important area of findings. The simple answer is, yes.

1) Course 1 uses a format for presenting information, which is different than the other two courses. The author calls it Learning Text and it relies on learning theories on how to organize information for adult learning. Students find this format Very Effective when compared with the other two courses that use the more usual lecture notes format independent of any named theoretical construct.
2) As discussed earlier, the level and style of use of e-mail and Bulletin Boards by different professors reveal that the professor's communication style has an impact upon the amount and breadth of the student's communications online. As is the case in classroom instruction, online instructors must allow time for students to respond to the comments or questions asked by other students.
3) Higher levels of Bulletin Board use leads to higher correlations between this variable and final grades as well as higher scores on final exams. We also noted that students who are less participatory onsite are more participatory online.

References

The Institute for Higher Education Policy (2000) *Quality On the Line: Benchmarks for Success in Internet-based distance education.* You can obtain an online copy by requesting it from: http://www.ihep.com

NOTES

[1] This paper is one of three papers that will be prepared from the study data. The other two professors will take other elements of the study and report and expand on them. This is the first paper to emerge.

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